

Journal of the Biblical Creation Society **BC15**

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EDITORIAL

“Studies Have Shown”

At the popular level, scientific evidence is received more in terms of the perceived authority of its proponents than in any coherent grasp of the facts or appraisal of the validity of the argument. To be sure, the complexity of problems and proposed solutions alike almost inevitably condemns popular media presentation to the barest of assertions dressed in the most dramatic garb the circumstances will allow. “Studies have shown . . .” has become the “Thus saith the Lord” of media science. It is not even a question of some great plot by scientists to mislead the masses. It is simply a manifestation of the universal craving of man for authoritative revelation — revelation which both comforts and excites him; revelation which he *wants*; revelation which fits in with his view of things, his *Weltanschauung*; revelation uncluttered by any great necessity to think. The rise of the occult, even at the level of breakfast TV’s High Priest, Russell Grant, the growth of religious groups that are “high” on experience and low on teaching content and, of course, the continuing hold of ritualistic religious “spectacular” and media-Popes on vast multitudes all confirm this and, I believe, give biblical Christians some pointers as to the form of our witness in the modern world.

On the one hand, we must insist on proper, though popular, presentation of the evidence — in our case, that which pertains to the question of origins — and so inform and challenge men and women to think through the issues. Too often, creationists are guilty of the very things we find so objectionable in evolutionism, namely, stating our positions in terms of unsupported assertions or else basing arguments on assumptions which will just no longer hold up. The recent re-appraisals in the neo-Darwinian camp might profitably be echoed in some creationist candour and re-evaluation. A recent example of this need is found in the January, 1983 issue of *Ex Nihilo*, the Australian creationist magazine, where an article identified a 300-400 year old skeleton as a human fossil from Noah’s Flood! Something may appear in this journal in the near future on this subject. The point is that evidence is of the essence in any discussion. The biblical faith is an historical faith — it is a revelation into history. It is *presuppositions* given by revelation (the Word of God) and *evidence* in the works of God in creation and providence, of which the Word is the authoritative interpreter. Creationists welcome the real evidence of science and have a duty, — more than that, the privilege, — that of opening it up and showing how it confirms all that God has said about His world, how it came into being, and how it assumed its present form.

On the other hand, we must authoritatively *declare* both what God has said and done. In particular, we must seek, as simply and dramatically as we are enabled, to present the glory of God in His works — the wonders of nature, if you like. A picture can say more than a thousand words. A beautiful scene or a

mechanism like that of the hammer-orchid can fill the human heart with a sense of awe and wonder, even a sense of God's presence and power, when the assembled tomes of science and theology at best add up to a challenge, exhausting to body, soul and spirit alike.

In a very modest, but hopefully not unhelpful way, this journal and other B.C.S. projects are seeking to strike that balance, so often lacking on both sides of the discussion of origins. The present issue includes something on basic theology for everyone — Watts' article on *The Reality of Heaven* — and a technical paper for the specialist in Peet's study of *Isochrons and Pseudoconcordance in Radiometric Dating*. And there is the wonder of God's design in nature in Grant Lambert's piece on the Bucket Orchid. The accompanying issue of *Rainbow* (No. 5) seeks to extend this approach to the most general readership.

At the end of the day, even the clearest evidence and the boldest and most persuasive declaration of truth has its limitations. You will remember that in the story of the Rich Man and Lazarus (Luke 16:19-31) the Rich Man, in hell, asks that Lazarus be sent to warn his five brothers so that they would escape his fate. He supposes that if someone from the dead went to them, they would repent. But Abraham replies, "If they do not listen to Moses and the Prophets, they will not be convinced, even if someone rises from the dead." The same stricture applies to finding Arks on Ararat and human fossils in allegedly Miocene limestone and even human footprints in Cretaceous strata beside dinosaur tracks. If they do not listen to God's Word ("Moses and the Prophets") they will not be convinced. It is not that presenting the evidence is useless — it is important and a necessary part of our testimony. Ours is an historic faith. But the heart of the matter is the matter of the heart and it is the Word of God accompanied by the Holy Spirit that alone is the "two-edged sword" that opens the heart of a sinner and makes him willing in a day of God's power to receive Christ as his Saviour and Lord and thus to begin to understand the biblical world and life view.

Gordon J. Keddie

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THE REALITY OF HEAVEN

David Watts

The Hebrew word *šamayim* (heaven) has some diversity of meaning in the Biblical writings.¹ We shall begin by noting this diversity with reference to Table 1 and then discuss the underlying unity of the Biblical viewpoint. Then the meaning and significance of the Ascension of Jesus Christ, and also the future creation of the new heavens and the new earth, will be considered.

TABLE I

The diversity of the Biblical concept of Heaven.

	CREATED	UNCREATED
INVISIBLE	IIIA Abode of heavenly beings — the angels.	IIIB God's transcendent abode.
VISIBLE	II stellar heaven I Atmospheric heaven.	

1. Diversity

In the opening verse of the Bible we read of the creation of “the heavens and the earth.”² These two terms comprehend the whole of reality distinct from the Creator, and together are similar in concept to ‘the universe’. Thus the initial reference of the term heaven is to a segment of *created* reality. As far as the visible, or physically detectable, aspect of the created world is concerned, heaven is the upper region of the cosmos, spatially above the earth. Sometimes a distinction is perceived between the ‘first’ heaven (I), the relatively lower atmospheric region where the birds fly (*Deut* 4:17; *Ps.* 8:8; *Prov.* 30:19; *Jer.* 8:7; *Matt.* 6:26), and the ‘second’ heaven (II) where the sun, moon and stars are situated (*Gen.* 1:14-18). When referring to either of these regions (I or II) *šamayim* could be translated ‘sky’ — as in the NIV.

It is equally clear, however, that the term Heaven is used in another sense by the biblical writers. There is the distinction between the visible (I and II) and the invisible (III) heavens. Paul refers to the (normally) invisible heavens as the ‘third heaven’ and as ‘paradise’ in *2 Cor.* 12:2, 4. Analogically, therefore, the word heaven stands for the ‘spiritual’ world (IIIA), ‘above’ and ‘beyond’ men and thus also for the realm of divine transcendence (IIIB). The spiritual world

(IIIA) is inhabited by heavenly beings, such as the angels — both good and evil (Eph. 6:12; 3:10). As such this is still part of created, although physically undetectable reality. It is a dimensional realm normally invisible to man, where God reveals his presence enthroned in the midst of myriads of heavenly beings. To refer to heaven as God's abode (IIIB), however, is to refer to the 'spatial' attributes of God himself. In this sense, heaven transcends human comprehension and the created categories of space and time. God's eternal abode can be nothing else than God Himself. In Trinitarian fellowship He is Himself a perfectly self-sufficient dwelling place. There are perhaps few references to heaven in the Bible which are exclusively concerned with sense IIIB.

A few expressions of Scripture, however, do appear to go beyond the created world into eternity: "Look down from heaven and see from your lofty throne, holy and glorious", (Is. 63:15; cf 57:15; Ps. 68:33). In other cases such as the many references to God dwelling in heaven, the meanings IIIA and IIIB are evidently intertwined, although in the Biblical world-view, with its fundamental Creator/creation distinction, these meanings are in principle separable. In Solomon's prayer at the dedication of the Temple, for example, we find the rhetorical question: "But will God really dwell on earth?" Solomon then refers to the created heavens in their totality (I, II, IIIA): "The heavens, even the highest heaven, cannot contain you", (I Kg. 8:27). This majestic statement of divine transcendence is followed nevertheless by the repeated designation of heaven as God's dwelling place (v. 30, 32, 34, 36, 39, etc.). This must include sense IIIB. Yet sense IIIA is also involved since God is certainly present in the created, invisible heavens. In some of the visions of the (invisible) heavens, such as *Revelation* 4-5, a veiled description is given of the inner reality of the heavenly court around the throne of God.

2. Unity

When the range of meaning in the Biblical idea of heaven is considered it may seem that there is no connection or unity between the different ends of the spectrum. However, it is often overlooked that the visible heavens have been created to *mirror* the transcendent glory of God. As the Psalmist says: "The heavens declare the glory of God, the skies proclaim the work of his hands", (Ps. 19:1).

Accordingly, the visible heavens reflect in a finite way something of the glory of both the invisible heavens (IIIA) and of the attributes of God. In particular the visible heavens call forth a realization of the smallness of man in comparison to the transcendent greatness of God (Ps. 8:1-4), although man has a derivative significance as God's image-bearer (Ps. 8:5-8). To mortal and finite men, the furthestmost visible heavens are inaccessible and thus reflect the transcendence of God 'above' (Ps. 115:16). Indeed it is possible to define

Watts: The Reality of Heaven

Heaven in a unified Biblical way, covering senses I, II and IIIA, as ‘That part of creation not accessible to the ruling powers of men made of dust.’³ This concept is expressed in classic fashion in *Deut* 30:12: “It (God’s revealed law) is not in heaven, so that you will have to ask ‘Who will ascend into heaven and get it and proclaim it to us so we may obey it.’”

Again in *Prov.* 30:4a the question is asked: “Who has gone up to heaven and come down?” Answer: No one!

The Tower of Babel episode in Genesis 11 records the attempt of early man to scale the heights of heaven. Their divinely-frustrated plan illustrates the inaccessibility of God’s abode to mortal man.

3. The Ascension

When the early Christians confronted men with the fact of the empty tomb and the evidence of Christ’s continuing activity in the gift of the Holy Spirit the inevitable question was, ‘Where is Jesus now?’ The NT answer to this question is that Jesus, being raised from the dead, has ascended to heaven. From one angle the ascension involved the departure and relocation of the incarnate Son of God in a definitely spatial sense. The glorified human body of Jesus is now located in the invisible created heavens (IIIA). But from another perspective the incarnate Jesus is also the divine Son of God who inhabits heaven considered as God’s abode (IIIB), with the corresponding transcendence of created spatio-temporal categories.

The Epistles to the Ephesians and to the Hebrews both contain striking references to the Lord’s ascension and to the new heavenly sphere from which his work is now carried forward.

Fundamental to the thought of the Ephesian epistle is the consideration that Christ is now exalted to a sovereign position in heaven, from whence he rules over the entire universe; see especially *Eph.* 1:20-23. United to Christ, the Christian even now receives the benefits of Christ’s life-giving blessings (1:3; 2:4-6).

In *Eph.* 4:10, Paul states that Christ has “ascended higher than all the heavens, in order to fill the whole universe.” In terms of our previous analysis, the ascension “higher than all the heavens” is an elevation beyond the limitations of sense — i.e. *beyond the visible heavens*. Consequently Christ has entered the *invisible heavens* and thus — in his omnipresent divine nature “fills the whole (created) universe”. Similarly *Hebrews* 4:14 refers to Jesus, our great high priest, who has “gone through (*dielēluthota*) the (visible) heavens.” Again, *Hebrews* 7:26 states that this Jesus is “exalted above

(*hupsēloteros*) the heavens.” This signifies the fulfilment of his high priestly office, for he has thus reached the very throne of God by his reception *into* the (invisible) heavens, (*Heb* 9:11, 24; 1 *Pet.* 3:22).

4. A New Heaven and a New Earth

Modern scientific cosmology is concerned with the structure of the universe in terms of the two basic axes: space and time. So far we have considered Biblical cosmology in terms of spatial structure. Now we must bring ‘time’ into the picture. The Biblical view of time is essentially linear and it is this Biblical-Christian concept of time which gave birth to the linear view of time possessed by Western culture and modern science. The Bible conceives time as an aspect of creation’s onward movement towards the final consummation. Biblical eschatology holds forth the bright promise of a renewed creation where heaven and earth will be freed from the manifold effects of human sin. This hope is clearly expressed in many passages in *Isaiah* 40-66. The link is emphasized between creation and eschatology. The God who controls the future is also the one who created and sustains all things. This present universe will wear out like a garment and vanish away. But God will create new heavens and a new earth, (*Isaiah* 51:6; 65:17; 66:22). This view of cosmic eschatology is reinforced in the NT — for example, *Hebrews* 1:10-12; 2 *Pet.* 3:13; *Rom* 8:21; *Revelation* 21:1. Whilst there is so much about the renewed universe which is not yet revealed to us, it is important to realize that the Bible envisages this great and certain change in the future. The God who is the Alpha and the Omega will complete his eternal purpose in a world where righteousness dwells.

Notes

1. The Hebrew term *šamayim* is dual in form. However, this does not prove an underlying two-fold sense to the word. That must be ascertained from the context. Sometimes the compound expressions *šame haššāmāyim* and *haššamayim šamayim*, “the heaven of heavens” occur, distinct from “the heavens”, as in *Deut* 10:14 and *Ps.* 115:16, respectively. The fact that the plural form *ouranoi* (heavens) occurs in the NT is probably due to the influence of the Hebrew. The plural form is in general used interchangeably with the singular in the NT. However, it may be noted that in the Fourth Gospel and the Apocalypse the singular form (heaven) is used exclusively (with the lone exception of *Rev.* 12:12 where there is a citation from the Septuagint version).
2. The atmospheric heavens (I) were formed on day 2 of creation as a derivative of what is called ‘earth’ in *Genesis* 1:1-2. By contrast, the ‘heavens’ formed in the very beginning (v. 1) are subsequently said to contain ‘all their host’ (*Nehemiah* 9:6, cf. *Rev.* 10:6, *Col.* 1:16). This may denote the stars (*Isaiah* 40:26) and / or angels (*Ps.* 148:2).
3. Vern S. Poythress, *Philosophy, Science and the Sovereignty of God* (PRPC, 1976) p. 14.

THINKING AGAIN ABOUT FOSSILS

By David J. Tyler

Throughout history, people have known that some of the rocks of the earth have fossils entombed in them. Shells of marine creatures are relatively easy to find, but it is generally in museums that we are able to view the remains of plants, fishes, reptiles, mammals and other once-living organisms. People have asked questions: What are these fossils in the rocks? What do they mean? How did they get there? The answers are not so easy! Debate over differences of view continues to this day.

Before the theory of evolution became popular, it was generally believed that God had created all the plants and animals, and that great catastrophes had buried living things in sediment, after which they turned into fossils. Those who studied the fossil record found their creationistic views consistent with the evidence from the rocks.

Fossils and Darwinism.

Although Charles Darwin was interested in fossils, he never specialised in their study. Rather, Darwin was a naturalist, who concentrated his attention on living things. He was impressed by the amount of variation which organisms exhibited, and he used this as evidence to support his theory of evolution by natural selection. He saw no limit to variation. The theory proposed was that continual small gradual changes, when selected according to the principle of survival of the fittest, were able to change fishes into amphibians, amphibians into reptiles, and so on. Darwin believed he had plenty of evidence to show variation in the present. But what about the past? If his theory is true, should we not expect the fossil record to document the origin of species — illustrating the gradual changes that were necessary to transform one type of organism into another. Do the fossils confirm Darwin's evolutionary ideas?

It is interesting to note that at first Darwin's theory was not well received by palaeontologists — the scientists who study fossils. They could not see any evidence of the gradual changes predicted by his theory of evolution by natural selection. Some variation was present, but nothing to suggest one type of animal changing into another. The response of the Darwinists was to say that the fossil record was both imperfectly preserved and imperfectly known. They referred to the existence of numerous gaps in the geological record and suggested that there would always be difficulty in finding 'transitional forms' between species. However, they also held out the hope that some of the gaps would be filled as a result of subsequent collecting.

Over 100 years have passed — and millions of man-hours have been spent

examining fossils. Has the hope been fulfilled? Have the transitional forms been found? Until recently, the general public have been given the impression that Darwinism has been amply confirmed by the fossil record. In 1958, the British Museum (Natural History) displayed an exhibition on evolution to mark the 100 years anniversary of the first publication on the subject by Charles Darwin and Alfred Russel Wallace. In the exhibition handbook, Sir Gavin de Beer said this about the fossil record: "The palaeontological record provides evidence of the course of evolution in the past. Fossil material is in places now so rich that it can be used for quantitative studies in evolution." The reader is given no hint of the problems facing evolutionary theory caused by the fossils. At that time, de Beer and many other leading scientists presented a picture of the fossil record which today must be recognised as seriously defective.

Fossils And New Ideas About Evolutionary Change.

The last 10 years has seen a remarkable change in discussions about Darwinism. Scholars are much more open in their criticisms of the different theories. Again, palaeontologists have led the way. It seems that the majority of palaeontologists have never been happy with Darwin's 'gradualism', because they do not see the evidence for gradual change in the fossil record. Whilst they recognise the existence of numerous gaps in the sequence of sedimentary rocks, they are not convinced that the fossil record is as impoverished as Darwin had suggested in "The Origin of Species". Nowadays, most palaeontologists are ready to admit the near-universal absence of transitional forms and are not willing to explain them away geologically. It is important to realise that although these palaeontologists reject the idea of natural selection acting on small changes (gradualism), they still believe in evolution. The new theory is known as "Punctuated Equilibria", and it postulates long periods without significant change terminated by short periods of very abrupt change. In their thinking, these evolutionary bursts occurred sufficiently rapidly to make it unlikely that transitional forms were preserved as fossils. Although this model of evolutionary change in compatible with the fossil record, it conflicts with the theoretical ideas about the mechanism of evolution which have been developed by the biologists. The evolutionary biologists rightly complain that the supporters of punctuated equilibria have no mechanism to account for rapid evolution. They also revive the argument which says that the fossil record is so inadequate, that it can never be used as evidence for or against Darwinism. And so the controversy continues!

Points For Thought.

What are we to learn from this debate? Obviously, it is very easy to get lost in the technicalities, and so a few general points are noted here.

(1) It must not be overlooked that the expectation of Darwin's theory about

the evolutionary changes occurring in living things in the past have *never been confirmed* by the fossil record. The evidence for Darwinian gradualism in the fossil record is nonexistent. It seems so obvious that if this major prediction cannot be justified, then it is necessary to re-examine the original theory! The palaeontological evidence against gradualism has always existed — and has become stronger with the passing of years. Darwin's original approach was to emphasise the fragmentary nature of the fossil record, but over 100 years of geological investigation must now be taken into account. Gradualistic evolution can no longer be defended by appealing to an inadequate fossil record.

(2) Scientists have allowed theoretical ideas and personal prejudices to influence their handling of the evidence. Why have scientists made claims about the fossil record which are nowadays recognised as misleading? There is a *human aspect* to all scientific work, and it is particularly significant when it comes to the study of origins. Those who believe in creation must believe in a Creator. Those who wish to deny the existence of a Creator God must find a naturalistic explanation of origins — and evolutionary theories provide a way of explaining how living things have come into existence without the need to invoke divine activity.

(3) Creationists predict an absence of transitional forms in the fossil record. They do not believe that one type of creature can change into another type, for God has made all living things to reproduce “according to their kinds.” Whatever else might be said about the fossil record, it is quite consistent with this prediction of the creationists. Consequently, creation has a right to be considered as an explanation of origins.

The surface of our planet contains the fossilised remains of once living plants and animals. For over 100 years, it has been customary to interpret the fossils *only* from within the framework of the theory of evolution. This article has argued that an alternative explanation or origins should be considered: divine creation. The absence of transitional forms in the fossil record is an embarrassment for evolutionists, but is the expectation of creationists. Consequently, it is time to think again about the meaning of the fossils!

DESIGN IN NATURE:

THE BUCKET ORCHID – ORCHARD BEE RELATIONSHIP

by Grant Lambert

A. Introduction

Mutualistic relationships (those beneficial to both species involved) abound in nature. Several such relationships were highlighted in a recent program of 'The World About Us' (BBC TV), intriguingly titled 'Sexual Encounters of the Floral Kind'.¹ Some remarkable mechanisms of pollination in plants were examined. These included film of hammer orchids which attract their conveyor of pollen, a male wasp, by imitating the body and even the scent of the female wasp; the arctic rose, which attracts insects in a cold climate by offering them warmth derived by means of sophisticated solar heating system; and the giant arum, which depends for pollination on bluebottles and attracts them 'by masquerading as the sort of rotting flesh blowflies really enjoy'.

In each case, mutualistic relationships probably originated either by time, chance and natural process or by plan, purpose and special creation (leaving aside here the postulate of eternal existence of species the 'steady state' theory of species²). Mutualistic relationships in which the overall design of the system is enabled by interdependent parts which would be of little or no survival value by themselves have frequently been cited as evidence for plan, purpose and special creation.^{3, 4, 5} Here the bucket orchid-orchid bee relationship will be considered as an exquisite example of this kind of relationship.

B. The Bucket Orchid-Orchid Bee Relationship

No better description could be given than that found in the Radio Times commentary¹ (see also Fig. 1) — 'The bucket orchid grows in trees . . . and depends for pollination on attracting the male orchid bee (1), which gathers from its surface (2) an aphrodisiac to arouse the interest of the female orchid bee. The flower has two glands (3) producing drips of fluid into the 'bucket' (cut away in this illustration). When a bee falls into the fluid, there is only one possible escape route — through a tunnel in the side of the chamber; the orchid offers a convenient step along the way (4). But at the last moment, the plant grips it around the waist, coats some glue on to its back, sticks on two pollen sacs and holds the bee until the glue sets (5). When a bee carrying pollen from another plant reaches this point, a hook protruding from the tunnel roof snatches the two bags from its back.'

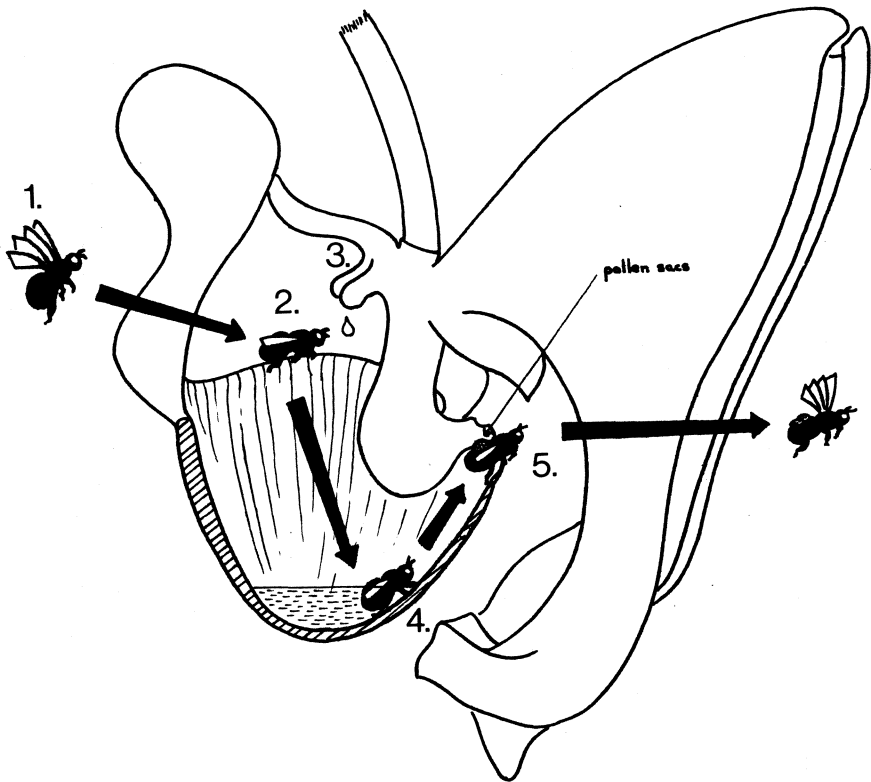


Fig. 1 The actual bucket orchid — orchid bee relationship.

C. The Origin of this Relationship

The difficulties in generating the bucket orchid-orchid bee relationship by time, chance and natural process become apparent when the consequences of an orchid possessing only some of the anatomical features which enable this relationship are considered (that is, hypothetical evolutionary intermediates from an ancestral orchid).

Stage 1: The Dead-End Street.

Suppose that an orchid evolves a suitable bucket and the ability to produce aphrodisiac (Fig. 2A). Bees which are attracted and fall into the fluid reservoir (Fig. 2A) will be permanently trapped because of the absence of an escape tunnel (which in the actual relationship is the 'only possible escape route').

Biblical Creation 5:15

Possibly, the bucket will eventually fill up with the bodies of dead bees (Fig. 2B) which have been unable to escape.

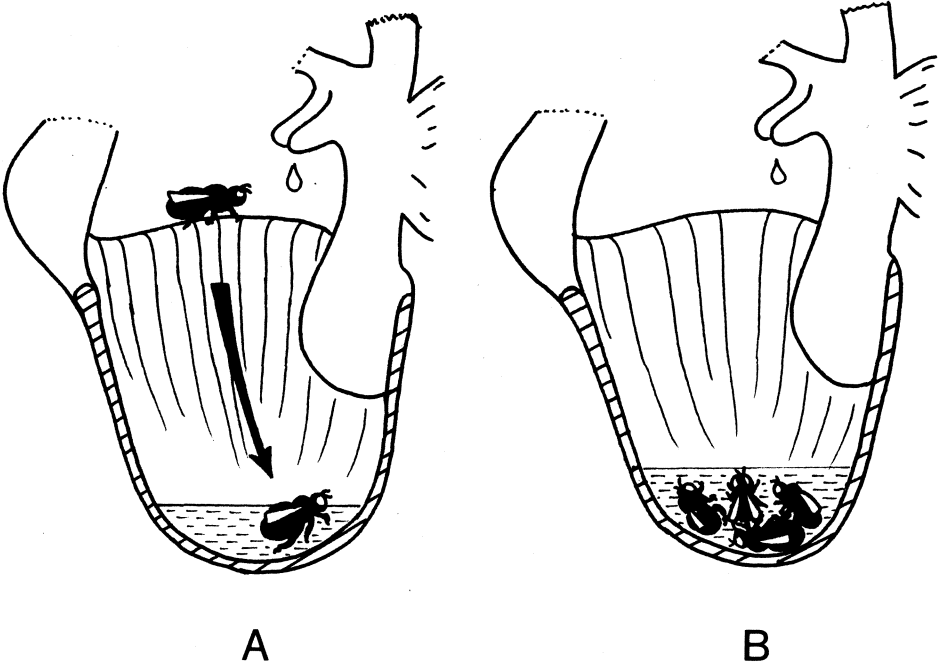


Fig. 2 Hypothetical orchid possessing a suitable bucket and the ability to produce aphrodisiac (A) and possible consequences(B).

Stage 2: The Scot-Free Bee

Suppose that an orchid somehow evolves a suitable bucket, the ability to produce aphrodisiac and an escape chamber (Fig. 3) (It may also be necessary to have the 'convenient step' (Fig. 1, point 4) for the bee to escape). This intermediate is very favourable for the bee — having bathed in aphrodisiac it is permitted to leave 'scot-free' without being burdened with pollen.

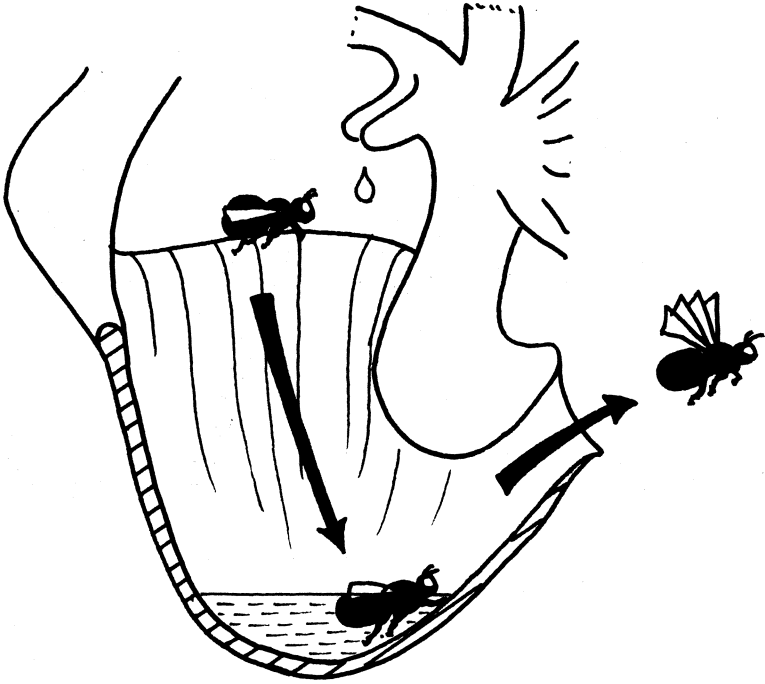


Fig. 3 Hypothetical orchid possessing bucket, aphrodisiac and escape tunnel enabling escape by the bee.

Stage 3: The Disappointed Queue

Particularly amusing is the next step, enabled by the evolution of the mechanism which *grips* the bee around the waist as it tries to escape (Fig. 4A). The unfortunate creature will be held until it expires (Fig. 4B), since the mechanism which releases the bee has yet to evolve. Possibly, a queue of bees will form behind the blocked exit (Fig. 4B), awaiting escape in vain.

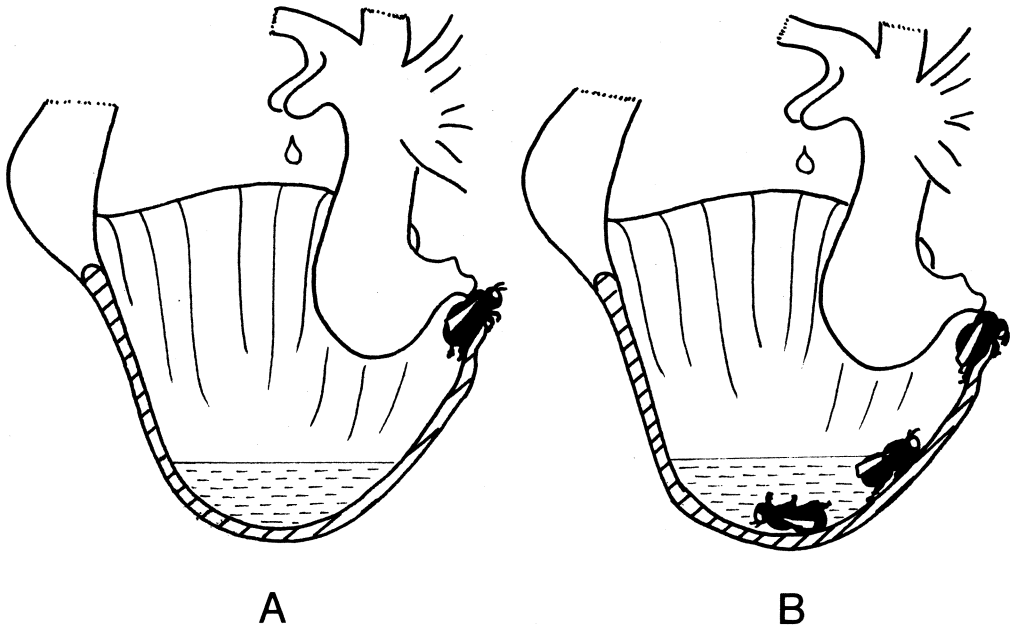


Fig. 4 Conditions as for Fig. 3 except that there is also the ability to grip the bee around the waist in the escape chamber (A); likely consequences (B).

Stage 4: The Parting Hug

Progressing further, suppose that both the mechanisms to grip and release the bee have somehow evolved (but not yet the mechanisms of pollen sac deposition and removal). Again, the bee escapes scot-free, being given a 'parting hug' by the affectionate orchid (which has already lavished aphrodisiac upon the bee before this caress).

Stage 5: The Pollen Bomber

Yet later, suppose that in addition to the mechanisms which grip and release the bee, the ability to deposit pollen sacs on the bee's back comes into being (at the right place in the escape chamber). Upon release from the escape chamber the bee will be a 'pollen bomber' (Fig. 5); its unsecured pollen load will be liable to fall off at any instant (The ability to glue the pollen sacs to the bee's back has yet to evolve).

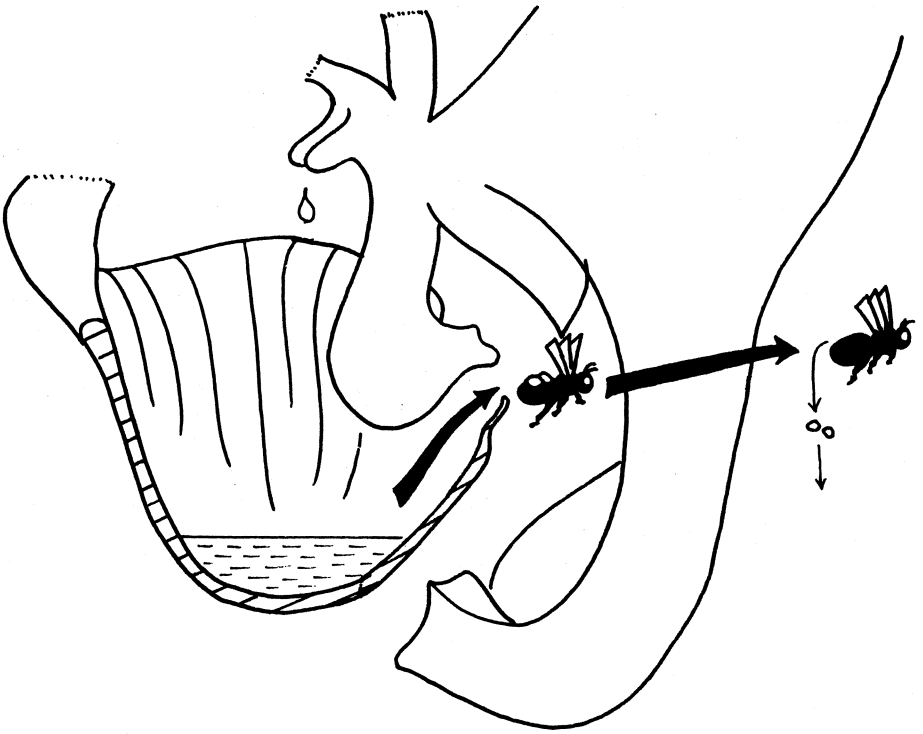


Fig. 5 A 'pollen bomber' bee with pollen but no glue.

Stage 6: A Sticky Situation

Suppose further that the ability to coat the bee's back with glue evolves. Note that the glue must be coated on the bee's back before the pollen. If the order is reversed, the pollen will be stuck not to the bee's back but to the roof of the escape tunnel! Moreover, the pollen sacs must be deposited before the glue has set on the bee's back, otherwise another 'pollen bomber' takes to the air. Finally, these difficulties aside, this almost complete relationship is still unworkable in that the bee with its glue and pollen load is liable to be released before the glue is properly set. The reader is invited to ponder the resulting sticky situation.

D. Fearfully and Wonderfully Made

The attempt to generate the bucket orchid — orchid bee relationship using time, chance and natural process by route of the dead-end street, the scot-free bee, the disappointed queue, the parting hug and the pollen bomber culminated in a sticky situation indeed (Section C). A more ingenious reader might be able to devise a somewhat less preposterous evolutionary scenario, perhaps drawing on 'hopeful monster' orchids to avoid untenable transitional forms. Nevertheless, to reckon that such intricate, artful, well-integrated and finely-tuned design came into being by chance clearly requires considerable faith.

The present example of the bucket orchid — orchid bee relationship emphasises that the real challenge to evolutionary theory is provided by a careful study of nature itself. This point was emphasised by Hardin in a book chapter entitled 'Nature's Challenges to Evolutionary Theory'. Having considered several remarkable instances of design in nature (parallel to the present example) against the background of the creationist concept championed by William Paley (1743-1805), he concludes⁴ 'Such are only a few of the unsolved puzzles facing biologists who are committed to the Darwinian theory. Are they beyond solution within the framework of this theory or not? Is the framework wrong? . . . Was Paley right? Think about it!'

References

1. The Radio Times, 12-18 September 1981, 'Sex and Violets', p. 6, 7.
2. Harper, G.H. (1980) 'Alternatives to Evolutionism' *Creation Research Society Quarterly* 17, 49.
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CREATION & CONSERVATION: The Ecological Orientation of the Christian Faith Part I

Both the biblical doctrine of creation and modern concerns about conservation are orientated to conceptions concerning the relationship of man to the world of nature. Both are concerned with actual relationships and both involve proposals for improved relationships. Both views of the place of man in the world are rooted in metaphysical assumptions which are orientated to ultimate commitments, to fundamental perspectives concerning the meaning of human life. The major link between the two is the fact that the perspective within which the issue of conservation is today considered is in large measure a secularisation of the Christian perspective. I have used the plural term 'perspectives' for with the rejection of the ultimacy of God, man as a religious creature has sought for ultimacy in himself and then in subsequent despair has sought it in nature. Modern concern for 'conservation' is torn between this faith in man and this faith in nature. Such concern, however, is deeply eroded by a sense of meaninglessness in modern culture marked by the escapism of living in the present, of not wishing to live, of fatalism and futility . . . men without God and without hope.¹

The Ultimacy of Man in Modern Thought

The decisive modern shift from the ultimacy of God to the ultimacy of man can be recognised in seminal form if one compares Calvin's *Institutes of the Christian Religion* with Descartes' *Discourse on Method*. For Calvin, man's self knowledge depended upon the true knowledge of God as He had revealed Himself. Consequently, man's understanding of his relation to the rest of creation and of his responsibilities to it — as a steward and tenant of God's world — depended on this revelation of Creation, Fall and Redemption. In Descartes, though he remained a member of the Roman Catholic Church, his point of departure was not the revelation of the sovereign God but man himself. *Cogito ergo sum* (I think, therefore, I am). His method of doubt brings him to the position of proclaiming that he exists and knows who he is — in terms of himself (I am that I am) — that his own existence may not be doubted though that of God, other people, the cosmos and even his own body could be. Any confidence concerning these could only be predicated on confidence — faith — in the self-existence of man. At the core of Descartes' position there is not serious recognition of the creatureliness of man as the image of God, in the Biblical sense. The sole function of 'God' in his philosophy is to underwrite absolute trust in man's mathematical-methodological thought i.e. in man himself, a projection of man's self understanding as *res cogitans*, made in the image of man. That Descartes proposes human reason rather than Christ as the light of man's understanding of reality is clear from the long title of one of his works which reads:

“The Search after Truth by means of the Light of Nature which alone, and without the assistance of Religion or Philosophy, determines what are the opinions which a good man should hold on all matters which may occupy his thoughts, and which penetrate into the secrets of the most curious of the sciences.”²

Power Over Nature

For Descartes the ‘Light of Nature’ was the light of human reason through which the Re-naisance was convinced that man could be re-born. It, and it alone, would give man insight and power. By means of it ‘ . . . his understanding may light his will to its proper choice in all the contingencies of life.’³ Indeed the insight would issue in power, specifically *power over nature*:

*“ . . . it is possible to attain knowledge which is very useful in life, and that, instead of the speculative philosophy which is taught in the Schools, we may find a practical philosophy by means of which, knowing the force and action of fire, water, air, the stars, heavens and all other bodies that environ us . . . and thus render ourselves the masters and possessors of nature.”*⁴

If such power was to be possible then men had both to reject the idea of their stewardship of a creation-order of which they are a part and to produce a highly reductionistic image of nature suitable to their methods of conquest. Most common in this period was a ‘mathematical-materialist’ image of nature as is exemplified in Descartes idea of nature (i.e. all of creation apart from the human mind) as *res extensa*. Two quotations will help to make concrete the two aspects of this image. Galileo wrote:

“Philosophy is written in this grand book, the universe, which stands continually open to our gaze. But the book cannot be understood unless one first learns to comprehend the language and reads the letter in which it is composed. It is written in the language of mathematics, and its characters are triangles, circles and other geometric figures, without which it is humanly impossible to understand a single word of it; without these, one wanders about in a dark labyrinth.”⁵

Similarly Hobbes wrote:

“The universe, that is, the whole mass of things that are, is corporeal, that is to say, body, and hath the dimensions of magnitude, namely length, breadth, and depth; also every part of body is likewise body, and hath the like dimensions, and consequently every part of the universe is body, and that which is not body is no part of the universe: and because the universe is all, that which is no part of it is nothing, and consequently nowhere.”⁶

With the further process of the ‘secularisation’ the biblical idea of the Creator-creation relation get transfered to the Man-nature relation, such that man

comes increasingly to conceive of 'nature' as his creature, his creation, that over which he does or should exercise unquestioned sovereignty. In his *Critique of Pure Reason* Kant strikingly maintains Man's cognitive conquest of nature when he writes:

"... the order and regularity in the appearances which we entitle *Nature*, we introduce ourselves. We could never find them in appearances, had not we ourselves or the nature of our mind set them there... Although we learn many laws through experience, they are still only special determinations of still higher laws, and the highest of these, under which all others stand, issue *a priori* from the understanding itself... Thus the understanding is more than a power of formulating rules through a comparison of appearances; it is itself the lawgiver of nature."⁷

It is hardly surprising that Robert Tucker entitles his brilliant exposition of Kantian philosophy 'The self as god in German Philosophy', for according to Kant it is the human understanding which brings a cosmos out of chaos.⁸ Heaven and earth do not declare the handiwork of the Lord God. Rather it is the 'handiwork of the human mind and reveals man's glory and nothing of God's. (He is radically excluded and must remain 'backstage' as a postulate of practical reason... basically to reward *post mortem* with happiness all good Kantians who have come to regard their inner obligations as *divine* commands).

Technocratic Faith

This notion not only of human autonomy, as a law to itself and as the law over nature as well was continued by young Karl Marx who wrote in his Ph.D. thesis a declaration of opposition... "... against all gods, heavenly and earthly, who do not acknowledge the consciousness of man as the supreme divinity. There must be no god on a level with it".⁹ The main point of his opposition to Hegel was that Hegel maintained that reality as it was was already 'rationalised' i.e. subjected to human reason and no longer alienated from it. For Marx and the young Hegelians the cry was 'The realisation of Philosophy'. Hegel had misinterpreted reality as *already* rational. For Marx it was not yet so that the task was to change it, to make it rational. It was communism, scientific socialism, that was to effect the realisation of Philosophy. The way for this was prepared by capitalism. In his early work the *Grundrisse* Marx wrote that the 'great civilising influence of capital' lay in its rejection of the 'deification of nature'. Thus it was that 'nature becomes for the first time simply an object for mankind, purely a matter of utility.'¹⁰ The relationship of man and nature is spelt out more fully by his friend and colleague Friedrich Engels when he wrote that when communism comes:

"Then for the first time man, in a certain sense, finally marked off from the rest of the animal kingdom and emerges from mere animal conditions of existence

into really human ones. The whole sphere of the conditions of life which surround man, and which have hitherto ruled man, now comes under the dominion and control of man, who for the first time becomes the real conscious lord of Nature, because he has now become the master of his own social organisation. The laws of his own social action, hitherto standing face to face with man as laws of Nature foreign to and dominating him, will then be used with full understanding and thereby mastered by him. Man's own social organisation, hitherto confronting him as a necessity, imposed by Nature and history, now become the result of his own free action. The extraneous objective forces that have hitherto governed history pass under the control of man himself. Only from that time will man himself, more and more consciously, make his own history.¹¹

From the viewpoint of man's relationship to nature it is clear that the dispute between Marxism and Capitalism is very much a family quarrel. The former took over from the latter the labour theory of value¹² which maintains that the value of an object is precisely the amount of human labour required for its production. What is not mixed with human labour simply has no value. Consequently nature as such has no value. It becomes valuable when it is transformed from being mere 'raw materials' into products by man. Nature has no 'rights' over against man. Nature is the absolute property of man which is meaningless until man confers (economic) value on it by means of his labour. Both Marxism and Capitalism see man overagainst nature and view history as a progressive victory over her armed as they are with science and technology. Their small dispute concerns only the most *efficient* social organisation to assure this victory and distribute its fruits. Such a technocratic view of reality involves viewing not only nature but also human society in mechanistic terms so that the experts can decide on the most 'effective' solution to the problems which they have identified the 'real problems' with which they presume there is — or ought to be — a consensus. Such a technocratic faith proclaimed the 'end of ideology' precisely because it saw itself as the ideology to end all ideologies.¹³ The presumed end was the indefinite development of the means by which nature could be converted into products — the maximising of consumption by which this process would be kept in operation. Man was to be as producer-consumer in which the balance would shift from the former to the latter with increased efficiency. Hence the official art of the USSR is Social Realism (which glorified the worker as heroic) while the 'official art' of the USA, based in Madison Avenue, is advertising (which pictures the life of the consumer as idyllic). Technocratic faith is clearly exemplified in John F. Kennedy's Yale University Commencement Speech in 1962 when he declared:

"Today the old sweeping issues have largely disappeared. The central domestic problems of our time are more subtle and less simple. They relate not to basic clashes of philosophy or ideology, but to ways and means of reaching common goals — to research for sophisticated solutions to complex

and obstinate issues . . .

What is at stake in our economic decisions today is not some grand warfare of rival ideologies which will sweep the country with passion, but with the practical management of a modern economy. What we need are not labels and clichés but more basic discussion of the sophisticated and technical questions involved in keeping a great economic machinery moving ahead . . .

I am suggesting that the problems of fiscal and monetary policy in the Sixties as opposed to the kinds of problems we faced in the Thirties demand subtle challenges for which technical answers — not political answers — must be provided.¹⁴

Similarly it found theological expression in Harvey Cox's *The Secular City: a celebration of its liberties and an invitation to its discipline* published in 1965 and soon becoming a best-seller. In a section entitled 'Creation as the disenchantment of nature' Cox appeals to Max Weber's dichotomy between an enchanted and a disenchanted view of nature. On the one side is presecular tribal man and on the other the Hebrew view of creation and modern science. Cox wrote:

"Just after his creation man is given the crucial responsibility of naming the animals. He is their master and commander. It is his task to subdue the earth. Nature is neither his brother nor his god. As such it offers him no salvation . . . For the Bible, neither man nor God is defined by his relationship to nature. This not only frees both of them for history, it also makes nature itself available for man's use.

. . . . This disenchantment with the natural world provides an absolute precondition for the development of natural science. Since we have already shown that technopolis, today's technical city, would not have been possible without modern science, disenchantment is also an essential precondition for modern urbanisation . . . (in underdeveloped cultures) . . . Somehow nature must be disenchanted, which means the destruction of many traditional religions. This destruction took place in the past century mainly under the auspices of Christian missions. More recently it occurred as a result of the spread of Communist ideology. In this instance Christianity and communism, despite their differences, played nearly identical roles in the removal of traditional religious restraints to scientific and technological change . . . The disenchantment of nature is one of the essential components of secularization.¹⁵

Nor is this outlook peculiar to American 'secular theology' for it is equally present in both liberal existentialist theologies and conservative ones.¹⁶ For each the modern 'scientific-technological outlook' was taken as a fundamental pre-supposition of theological construction. For example Rudolph Bultmann rejects as mythological any representation of divine activity as if it were an

objective occurrence in the world. He writes:

We are compelled to ask whether all this mythological language is not simply an attempt to express the meaning of the historical figure of Jesus and the events of his life; in other words, significance of these as a figure and event of salvation. If that be so, we can dispense, with the objective form in which they are cast.¹⁷

But by what is Bultmann *compelled*? The activity of God is 'imprisoned' in the inner realm of personal existence, in large measure, because he views nature as an inviolable and mechanically determined causal system whose *absoluteness* precludes divine 'interference'. One critic has rightly deplored Bultmann's acceptance of "... the Kantian bifurcation of reality into nature and spirit and the expulsion of God's activity from the realm of nature... God was banished from the world of nature and history in order to secure for man's scientific conquest an unembarrassed right of way, and for faith a sanctuary".¹⁸

The irony — perhaps divine irony — of this situation was that while they were still busy making 'Christianity' respectable for modern secular come-of-age man on the Procrustean bed of the modern 'scientific technological outlook' a massive reaction set in against that very outlook leaving those very theologians high and dry.¹⁹

Faith in "Nature"

The reaction to the scientific technological outlook in the 1960's was on such a scale that historian Theodore Roszak published *The Making of a Counter Culture* with a subtitle of 'Reflections on the Technocratic Society and Its Youthful Opposition' in 1969. The reaction was indeed culture-wide. From Philosophers and historians of science like M. Polanyi, T.S. Kuhn and P.K. Feyerabend came a devastating critique of the neutral positivist image of science and the insistence that science was a responsible human activity rooted in metaphysical commitments. Many sociologists of science came to see science — and the universities — as the tools of the powerful in society engaged in suppressing the truth in many areas and using it for inhuman purposes — advertising and war-technology — in others. In 1964 Jacques Ellul's *The Technological Society* became available in English. For Ellul the 'progress' obtained by 'technique' consists centrally in a progressive de-humanization of man and society, an enslavement to a culture that nobody desires. In 1967 came E.J. Mishan's *The Costs of Economic Growth* in which he sought to demonstrate that the equation of economic growth with human welfare was not only questionable but that a serious case could be made for the view that they were inversely related in the present direction that economic growth was taking.

At the 'grass roots' came the concern for an alternative 'life-style' which was systematically opposed to the scientific-technological outlook. For our purposes what is most noteworthy is that the concern with the 'de-humanisation' of man came to include a concern about the 'de-naturing' of nature. Instead of being reduced to mathematical formulae for science and raw materials for industrial technology nature . . . or rather Nature came to be seen in a new light. Nature became re-enchanted. What was not 'natural' was rejected as 'artificial' or 'plastic'. 'Natural' foods were to be celebrated and 'junk' foods full of 'chemicals' were to be rejected. Behind the new rhetoric — which the hated corporations were all too soon to exploit — was a significant, even if in many ways limited, shift from *faith in scientific-technology* to a *faith in Nature*.

With this shift came a new perception of man's relation to nature. No longer was nature 'raw', chaotic, matter in motion to be organised by scientific-technology into sophisticated 'scientifically designed' products for the ever-increasing enrichment of man. Rather Nature came to be presented by the new science of ecology as an amazingly complex system with its own self-regulation ('balance of Nature') which Western scientific technology was in danger of wrecking . . . in fact in the process of wrecking and rapidly approaching the point of no return. The new imperative was not *power over nature based upon the pre-supposition that man was essentially separate from nature but rather conformity and submission to the ways of nature* for man was now seen as an element, albeit the dominant one, within the total ecosystem. This new theology-and-ethic of nature is not without its internal divisions. In some accounts man's dominance is acceptable if responsibly used although there are differences as to what that means. In others man appears as the anarchistic wrecker of what would be Eden in his absence, making him at best a 'necessary evil' with the true wilderness as the only unreservedly good and rational reality. Apart from differences as to what an ecological life style and culture might be there is promised minimally survival and maximally abundant life. The implicit images of nature range from 'spaceship earth' to a mystical-pantheistic one. Again the justifications for various policies concerning Nature are many and various ranging from 'took millions of years to evolve', 'reverence for all life' to 'our survival or that of our culture depends upon it' together with various weightings of our interests over against those of postulated future generations.²⁰

With this new concern for Nature whether in the strong form of faith in nature or the milder form of concern for nature it could be anticipated that there would be a reaction against any form of Christianity which had allied itself with the idea of the technological domination of nature. One of the first signs of this reaction is found in Aldous Huxley's *Island* published in 1962 and by 1968 in its 12th printing with half a million copies in print. Science education on the island of Pala is described in the following terms:

“We don’t have the money for large-scale research in physics and chemistry, and we don’t really have any practical need for that kind of research — no heavy industries to be made more competitive, no armaments to be made more diabolical, not the faintest desire to land on the backside of the moon. Only the modest ambition to live as fully human beings in harmony with the rest of life on this island at this latitude on this planet.²¹”

Consequently the school Principal explains that ecology is introduced early in education at the same time as multiplication and division:

“Never give children a chance of imagining that anything exists in isolation. Make it plain from the very first that all living is relationship. Show them relationships in the woods, in the fields, in the ponds and streams, in the village and country around it. Rub it in . . . And let me add . . . that we always teach the science of relationship in conjunction with the ethics of relationship. Balance, give and take, no excesses — it’s the rule in nature and translated out of fact into morality, it *ought* to be the rule among people . . . Treat Nature well and Nature will treat you well. Hurt or destroy Nature, and Nature will soon destroy you. In a Dust Bowl, ‘Do as you would be done by’ is self-evident — much easier for a child to recognize than an eroded family or village . . . Sand and gullies are parables. Confronted by them it’s easy for the child to see the need for conservation and then to go on from conservation to morality — easy for him to go on from the Golden Rule in relation to plants and animals and the earth that supports them to the Golden Rule in relation to human beings. And here’s another important point. The morality to which a child goes on from the facts of ecology and the parables of erosion is a universal ethic. There are no Chosen People in nature, no Holy Lands, no Unique Historical Revelations. Conservation morality gives nobody an excuse for feeling superior, or claiming special privileges. ‘Do as you would be done by’ applies to our dealings with all kinds of life in every part of the world. We shall be permitted to live in this planet only for as long as we treat all nature with compassion and intelligence. Elementary ecology leads straight into elementary Buddhism.²²”

The advocacy of a pantheistic Buddhism as the only ecologically responsible religion and the implicit rejection of Western Christianity is Huxley’s central contention. This rejection becomes explicit in the now familiar paper by Lynn White ‘The Historical Roots of our Ecologic Crisis’ first published in 1967.²³ White claims that “Our present science and our present technology are tainted with orthodox Christian arrogance.” This arrogance he holds stems from Genesis 1:26ff and which has been taken to mean, he claims, that nature ‘has no reason for existence save to serve man’. This charge has been amplified by Max Nicholson, a former Director-General of the Nature Conservancy who wrote:

“Historically the core of the cultural complex disseminating and maintaining errors of attitude and practice on these matters, and obstructing the way to harmony between man and nature has been organised religion . . . Inevitable though it may have been as a step towards progressive civilization, it was a tragedy that of all the religions of the world it should have been one of the very few which preached man’s unqualified right of dominance over nature which became the most powerful and influential, through the agencies of ancient Judaism and modern Christianity. Although it is arguable that the Old Testament implies some limits to man’s right ruthlessly to trample upon nature and recklessly to multiply his own numbers at its expense, any qualifications and restraints are feeble compared with its chronic and uninhibited incitement towards aggressive, exploitative and reproductively irresponsible behaviour in the human species . . . The inherent dangers and distortion enshrined in their (Judaism and Christianity) dominant myths of man’s role on earth have been aggravated by an increasing blindness and neglect to keep alive even those by no means negligible sympathetic contacts with nature which were part of the heritage of such earlier Christians as St. Jerome, St. Cuthbert and St. Francis.²⁴”

(To be continued)

In the concluding part of his paper, Richard Russell asks the questions as to whether, in fact, the Christian doctrine of Creation is at odds with a responsible policy of conservation. This will appear in B.C. 16

Notes

1. That there is also a connection between modern progress and fatalism is made clear by Karl Lowith in an article entitled ‘The fate of progress’. He writes: “The uncanny coincidence of fatalism and a will to progress presently characterises all thinking about the future course of history. Progress now threatens us. It has become our fate.” To this he adds that we are “*set free and yet imprisoned by our own power . . . Progress itself goes on progressing; we can no longer stop it or turn it around.*”
Nature, History and Existentialism and other Essays in the Philosophy of History (Evanston, Ill, Northwestern University Press, 1966) pp. 159, 160.
2. *The Philosophical Works of Descartes* (trans. E.S. Haldane & G.R.T. Ross, Cambridge University Press, 1969) vol. 1 p. 305.
3. *Ibid.* p. 2.
4. *Ibid.* p. 119.
5. ‘The Assayer’ in *Discoveries and Opinions of Galileo* (trans. with an introduction by Stillman Drake, Anchor Books, New York, 1957) pp. 237-8.
6. *Leviathan* ch. 46 Cf. Marjorie Grene’s brilliant essay ‘Hobbes and the Modern Mind’ in *The Anatomy of Knowledge* (ed M. Grene, University of Massachusetts Press, Amhurst, 1969). For a modern example of Hobbesianism see T.R. Jensen & W.P. Ferren *General College Chemistry* (Merrill Pub. Co. Columbus, Ohio, 1971) p. 1ff.
7. *Critique of Pure Reason* (trans. N.K. Smith, Macmillan, London 1964) A 126 p. 147-8. See also *Prolegomena to any future metaphysics* para 36 ‘How is nature itself possible’.
8. *Myth and Philosophy in Karl Marx* (Cambridge University Press, 1967).

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9. K. Marx & F. Engels *On Religion* (Foreign Languages Publishing House, Moscow, 1955) p. 15.
10. Marx's *Grundrisse* (ed. David McLellan, London, 1971) p. 94.
11. *Essential Works of Marxism* (ed. A.P. Mendel, Bantam Books, NY, 1965) p. 80 'Socialism: utopian and scientific'. Under Marxism in China the notion of cooperation with nature came to be replaced with the rhetoric of conquest, with such newspaper headlines as 'The Desert Surrenders' or 'Chairman Mao's Thoughts Are Our Guide to Scoring Victories in the Struggle Against Nature'. See Rhoads Murphy, 'Man and Nature in China' *Modern Asian Studies*, 1:4 (1967) p. 319.
12. First developed I believe, by John Locke, the father of liberal economic & social theory.
13. Ideology is not absent in the technocracy; it is simply invisible, having blended into the supposedly idubitable truth of the scientific world view. Thus the technocrats deal in "rationality", "efficiency", and "progress", speak the purportedly value-neuter language of statistics, and convince themselves that they have no ideological orientation. The most effective ideologies are always those which are congruent with the limits of consciousness, for then they work subliminally". Theodore Roszak *The Making of a Counter Culture* (Anchor Books, NY, 1969) p. 56n.
14. *New York Times*, 12/6/62, p. 20. quoted by Roszak p. 11.
15. *The Secular City* (Macmillan, NY, 1969) pp. 23-4.
16. This disenchanted view of nature one can encounter in literature as diverse as Dietrich Bonhoeffer's *Letters and Papers from Prison to Christianity in a Mechanistic Universe* (ed. D.M. Mackay, IVP, London, 1965).
17. 'New Testament and Mythology' in *Kerygma and Myth* (ed. H.W. Bartsch, Harper Torchbooks, NY, 1961) p. 35. Similarly Barth in his radical rejection of natural theology and general revelation regards nature as a dumb and God-less stage on which the drama of redemption takes place. S.U. Zuidema writes of Barth:

"All of the exegesis of Genesis 1 is dominated by this allegorical method. It is the reason that Prenter spoke of "creation docetism" in Karl Barth. Karl Barth, just like Karl Marx, has little interest in nature. His doctrine of creation immediately heads for a theological anthropology, just as this anthropology . . . heads for a soteriological Christology that it is governed by this Christology. For example, as early as Genesis 1:1 he reads the name of Jesus Christ . . . the result is that Genesis 1 and 2 no longer get a chance to say anything themselves. In fact, they have nothing to say anymore, and they could very well be eliminated from our Bible, since we would not miss anything anyway,"

'The Structure of Karl Barth's Doctrine of Creation' in *Communication and Confrontation* (Kampen/Assen, Royal VanGorcum Ltd/J.H. Kok, 1971) pp. 316-7.

Similarly H. Dooyeweerd comments on Barth:

"Dialectical theology had of course severed itself from the Greek and scholastic conception of nature. Having undergone humanism, it incorporated the new humanistic view of nature in its dialectical tension with the humanistic view of freedom. Here the difference also becomes apparent. Whereas the Roman Catholic Church accepted the Greek view of nature in a positive sense by attempting reconciliation with the christian creation motive, Barth allowed the creation motive to receded from sight, sacrificing it to the motives of fall and redemption in Jesus Christ. The great master of dialectical theology had no use at all for creation ordinances that might serve as guidelines in our "natural life". According to Barth the fall corrupted "nature" so thoroughly that the knowledge of the creation ordinances was completely lost".

Root of Western Culture: Pagan, Secular & Christian Options (Wedge, Toronto, 1979) p. 146.

18. Robert Cushman, "Is the Incarnation a Symbol?" *Theology Today* vol. 15 (1958) p. 179.

19. John Passmore's comment is to the point

"In the early decades of the present century, Christian apologists were particularly anxious to establish that science and technology were of Christianity's making. For science and technology were widely esteemed as the secular saviours of mankind. Now, ironically enough, Christianity finds itself condemned as the progenitor of a diabolic technology". *Man's Responsibility for Nature* (Duckworth, London, 1974) p. 11.

20. For one of the best discussions of these complexities see Passmore *op. cit.*
21. *Island* (Bantam Books, NY, 1968) p. 216
22. *Ibid.* pp. 217-8.
23. *Science*, 155 (1967), 1203-7.
24. *The Environmental Revolution* (Hodder & Stoughton, London, 1970) pp. 264-5.

EARTH SCIENCE SEMINAR PAPER
ISOCHRONS AND PSEUDOCONCORDANCE IN
RADIOMETRIC DATING

J.H. John Peet

Though the age of the earth is hotly debated among creationists, it is not crucial to the creationists' position except as an understanding of how Genesis 1 should be interpreted. To the evolutionist, the age of the earth is crucial — it must be very old (e.g. 4.5×10^9 years) to give his mechanism even a chance of consideration! Radiometric analysis is his usual weapon, especially isochrons and pseudoconcordance curves. These have been developed as his "saviours". But, do they work?

When a radioactive isotope undergoes decay, the process is governed kinetically by a well-established rate law, relating the time during which decay has occurred and the number of active atoms to a rate constant (called "the decay constant").

For a simple process in which the parent isotope is decaying into a stable daughter isotope, the law can be expressed as

$$t = \frac{1}{\lambda} \cdot \ln \left(1 + \frac{D}{P} \right)$$

where D, P represent the number of atoms of the daughter and parent isotopes after time t, and λ is the decay constant. So, if we can compare the amounts of D and P present and we know λ , then we can calculate the "age" of the rock.

An example would be in the study of the decay of uranium ore such as zircon, which contains up to 4000 ppm of uranium. One of the isotopes of uranium present is ^{238}U ; this decays to ^{206}Pb and has a decay constant of $1.55125 \times 10^{-10}/\text{y}$. This is widely used for chronological purposes. (1).

Constraints

(a) The precision of determination of the ratio of concentration of the isotopes. This ratio is normally determined by mass spectrometry (MS) or X-ray fluorescence spectrometry (XRF). Andrews has pointed out that the limit on precision is 1:100(2). So, if any daughter product is present, it must be read

as giving a D:P ratio of at least 0.01 (one part in the hundred). The result is that the rock is interpreted as being at least $(0.014 \times \text{half-life})$ in age. The half-life is the time it takes for half of the parent material to decay. For $^{238}\text{U} \longrightarrow ^{206}\text{Pb}$ the half-life is $4.468 \times 10^9\text{y}$. So, the rock would have to be $6.25 \times 10^6\text{y}$ old (experimentally) even if it was formed only a year ago.

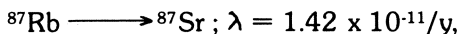
(b) The system must be closed — there must be no movement of relevant isotopes into or out of the system, otherwise the measurements are chronologically meaningless. As we shall see, this assumption breaks down frequently, by general acknowledgement.

(c) The intermediate isotopes are in equilibrium. The decay scheme described is a simplification. There are thirteen intermediates; the concentrations of these are determined by the amount of the uranium and time of decay. In a relatively short time their concentrations reach a maximum, since their rate of decay balances the rate of formation. Read has reported a lunar rock analysis which has upset the uniformitarian view. (3). One intermediate, ^{230}Th (thorium), is present in substantial excess.

The reason for the concern is that this excess thorium ought to have disappeared according to the evolutionists' time scale. Substitution in the equation given in the introduction would show that in ten half-lives the amount of the isotope would reduce to one-thousandth of the original amount; twenty half-lives and it would be down to one-millionth of the initial amount. Thorium -230 has a half-life of 80000y, so in 1 to 1.5 million years the excess would be effectively wiped out — but it is not, so how old is the rock?

(d) There was no mixing. If the sample had interchanged its components with another sample, whether locally or on a world scale, again the measurements would be meaningless as a chronological device. As we shall see, this affects our interpretation of the evolutionist's data.

(e) One crucial problem is the difficulty of determining how much of an isotope was present when the rock was formed, i.e. how much was non-radiogenic. This problem was "overcome" by the use of *isochrons*. The technique has been widely used in rubidium-strontium dating:



$$\text{half-life} = 4.99 \times 10^{10}\text{y}.$$

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Now,

$$\left[\begin{array}{c} \text{the present} \\ \text{amount of } ^{87}\text{Sr} \end{array} \right] = \left[\begin{array}{c} \text{the original} \\ \text{amount of } ^{87}\text{Sr} \end{array} \right] + \left[\begin{array}{c} \text{the radiogenic} \\ \text{amount of } ^{87}\text{Sr} \end{array} \right]$$

The last term can be determined from the earlier equation, where

$$D = \left[\begin{array}{c} \text{the present} \\ \text{amount of } ^{87}\text{Sr} \end{array} \right] - \left[\begin{array}{c} \text{the original} \\ \text{amount of } ^{87}\text{Sr} \end{array} \right]$$

$$\text{and } P = \left[\begin{array}{c} \text{the present} \\ \text{amount of } ^{87}\text{Rb} \end{array} \right]$$

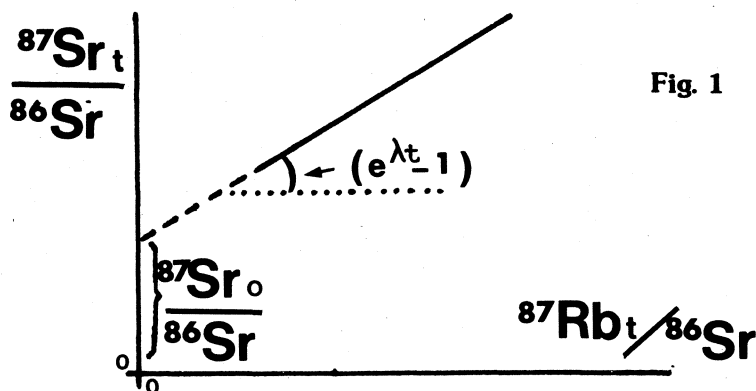
By substitution,

$$(^{87}\text{Sr})_t = (^{87}\text{Sr})_o + (^{87}\text{Rb})_t (e^{\lambda t} - 1),$$

Where the subscripts t and o refer to the amounts after times t and zero respectively.

Since the absolute amounts of these isotopes cannot be determined, they are compared (by MS and XRF) to the amount of ^{86}Sr , which is assumed to be invariable with time:

$$\frac{^{87}\text{Sr}_t}{^{86}\text{Sr}} = \frac{^{87}\text{Sr}_o}{^{86}\text{Sr}} + \frac{^{87}\text{Rb}_t}{^{86}\text{Sr}} (e^{\lambda t} - 1).$$



Now, if we can measure the two terms corresponding to current quantities (i.e. those subscripted t) for several rocks (or minerals) of the same age (i.e. t is

constant), then a straight line graph of gradient ($e^{\lambda t} - 1$) will result. The intercept will give us a measure of the non-radiogenic strontium. (Fig. 1)

It seems foolproof! But, there are some basic problems. Obviously we must assume that our samples are of the same age. The vertical displacement on the graph is less than 1%, yet MS errors can be in excess of that; so the errors can be greater than the "age". It may seem strange, at first, that different minerals in the same rock can have these differing ratios; a cluster of points around one locus would be expected. The spread is due to the fact that different minerals will have different "affinities" for rubidium -87 and so will contain different amounts of radiogenic strontium -87. But, if they have different affinities for ^{86}Sr too (which is most probable), they cannot have a common $^{87}\text{Sr}/^{86}\text{Sr}$ value, which is essential to this interpretation.

There is a further, substantial experimental problem for measurements based on the MS technique: you cannot resolve ^{87}Sr and ^{87}Rb , so measurement must be preceded by efficient chemical separation. The fact that straight lines occur seems to over-rule these objections, but we find that we can get similar linear plots for functions that are not time dependent (e.g. $^{54}\text{Fe}/^{86}\text{Sr}$ vs. $^{58}\text{Fe}/^{86}\text{Sr}$)! Finally, we will note here, that lines of negative slope (and so, age) have been achieved (e.g. in reference 4).

We must ask, therefore, whether there is an alternative explanation for these linear plots which will not be subject to these limitations. If there is, then it is up to the 'isochronologist' to prove that this alternative is not applicable and so dating is possible. We believe such a possibility is to hand (5). There are many anomalous results, causing chronologists to blame mixing processes (6), i.e. the system has become opened at some time. Matsuda (see ref. 5) has shown mathematically, that if a system is opened, a "virtual isochron" is obtained and the age is meaningless. Andrews has gone further (7), and he has shown that "any whole rock containing two or more minerals with different $^{87}\text{Sr}/^{86}\text{Sr}$ ratios must automatically give a false isochron, possibly of several hundred million years, even at zero age." Remember that requirement is crucial to the development of the plot above. As Jager and Hunziker report (ref. 1, page 142): "Many lead isotope studies . . . have revealed the presence of linear arrays of data points . . . They may be mixing lines or have the significance of isochrons." They confess that, in the former case, "The slope of the line has then no age meaning." Schneider has documented several causes of loss/gain of isotopes (8): leaching, sublimation, inhomogeneity and neutron bombardment, all of which are well documented.

Arndts *et al* (9) have pointed out a simple test to elucidate whether a linear plot is due to time or distribution. If the $^{87}\text{Sr}_i$ has arisen (in whole or in part) from ^{87}Rb , then a time dependent relationship can be expected. If, however, the $^{87}\text{Sr}_i$ concentration is primarily due to mixing/distribution it will be

dependent on the strontium concentration (designated Sr). As shown, a linear plot results if the $^{87}\text{Sr}/^{86}\text{Sr}$ term is plotted against $1/\text{Sr}$ in this situation. Remember, if the $^{87}\text{Sr}_t$ resulted significantly from radio-decay, then non-linearity would result in this case. They examined a number of published papers and found that the concentration effect was predominant and so no relevant deductions could be made about the age of the rock (contrary to the published claims). See Figs. 2a and 2b.

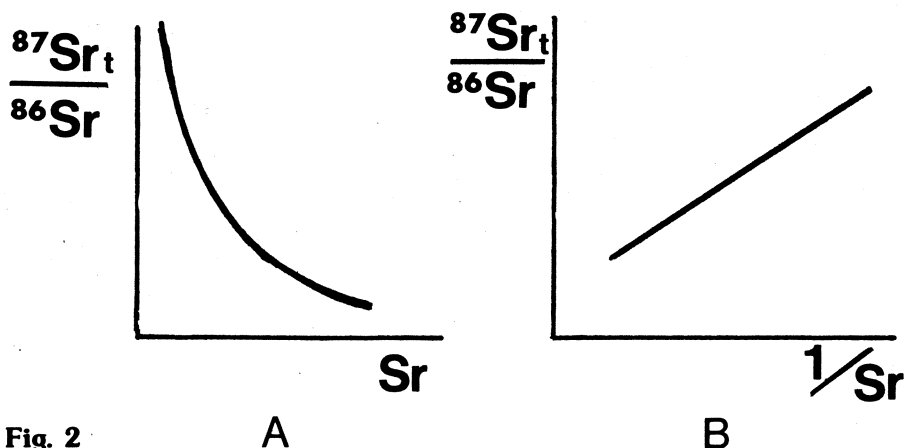


Fig. 2

(f) Another embarrassment for the radio-chronologists is that of *discordancy*. In the uranium-lead dating system, there are four possible "clocks", based on the decays of ^{238}U , ^{235}U , ^{232}Th and on the proportions of ^{207}Pb : ^{206}Pb . They should, of course, generate the same age. In a typical case (1), a zircon crystal gave four different ages:

$^{207}\text{Pb}/^{206}\text{Pb}$	$2.55 \times 10^9\text{y}$
$^{235}\text{U}/^{207}\text{Pb}$	$2.10 \times 10^9\text{y}$
$^{238}\text{U}/^{206}\text{Pb}$	$1.67 \times 10^9\text{y}$
$^{232}\text{Th}/^{206}\text{Pb}$	$1.56 \times 10^9\text{y}$

Invariably, the magnitude of the ages decreases in the sequence shown. (Fig. 3a) If we plot a curve giving the ratios of $^{206}\text{Pb}/^{238}\text{U}$ vs. $^{207}\text{Pb}/^{235}\text{U}$ expected at different ages, the curve illustrated is obtained. This is called a "concordia curve." The curvature of the line results from the differing decay constants.

Unfortunately, the data rarely lie on this line!

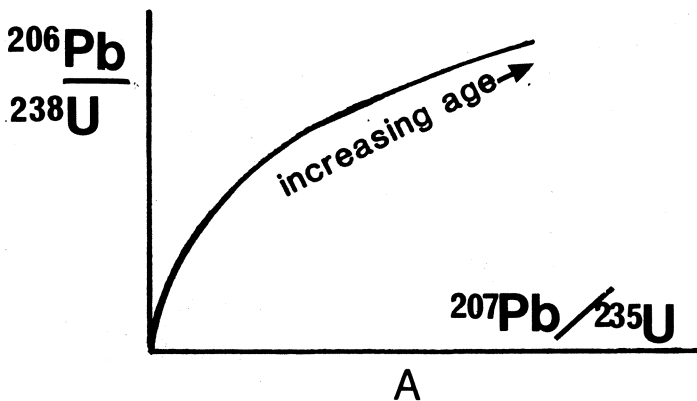
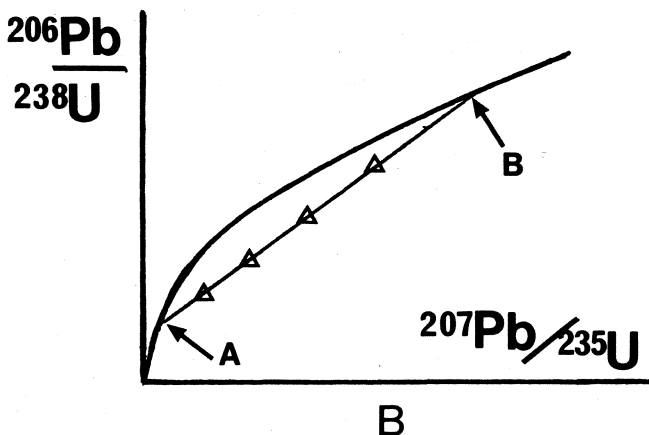
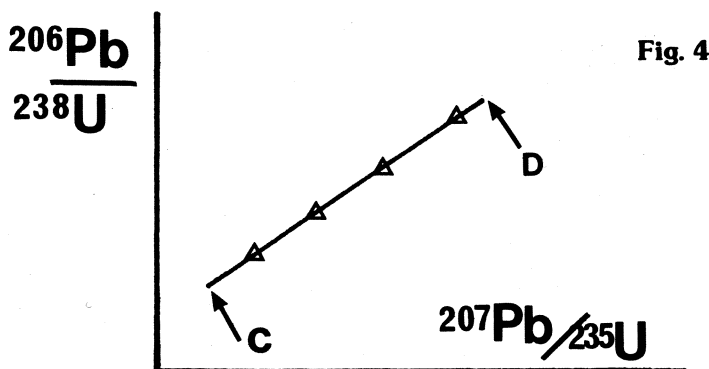


Fig. 3



A typical result is as shown in Fig 3b. The data lie on a straight line displaced from the curve and intersecting the curve at A and B. The usual interpretation is that the rock formed at B (say, 3×10^9 y ago) and then, more recently (point A, say 0.5×10^9 y ago) underwent a metamorphic change which resulted in a loss of lead. The percentage loss varied from mineral to mineral, and so the whole rock gives a series of points as shown, and A and B define the history of the material. Notice again, the introduction of an open system.

Certainly, if this scenario is correct, a linear plot would result. It can be shown simply, because each lead-uranium ratio would be linearly dependent on the proportion of lead lost, and so the ratios would be linearly related to each other. But, again, the results observed are not so clear-cut. Gebauer and Grunenfelder (11) not six alternative models including the mixing model.



Simply if two rocks have the initial compositions C and D (which could be identical to A and B) and they are mixed so that the resultant rock contains a fraction m of C, then a linear variation of composition with m results:

$$R = m \cdot C + (1 - m) \cdot D$$

$$\therefore R = m \cdot (C - D) + D$$

Conclusion

Though the chronologist talks confidently about “isochrons” and “discordia curves”, he frequently has to admit that they are not valid. For example, Gale *et al* begin their paper, “It is not widely appreciated, outside the ranks of those who work directly in geochronology or meteoritics, that, judged by modern standards, the meteorite lead-lead isochron is very poorly established . . . There is insufficient uranium and thorium to explain the observed development of radiogenic lead.” (12).

He is forced, therefore, to fall back to a mixing mechanism to account for his results and, consequently, has to abandon any real significance to the apparent dates. In one case, Cook says that the correction “effectively wipes out geological time” (13).

The chronologist must, in the name of scientific integrity, consider mixing in every case and eliminate it on scientific grounds, not on the basis of concordance with preconceived ideas. It would seem that their results are more consistent with a recent global catastrophe (or with a series of catastrophes), than with a distant rock formation.

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